

wing being forked beyond the middle. In a paper in the 'Proceedings,' for 1870, pp. 777-8, I recorded similar modifications of the first subcostal branch in the hind wings of *Acræa andromacha*, and in 'Lepidoptera Exotica' I described and figured modifications of the upper radial in the front wings of *Morpho sulkowskyi* (p. 113a, pl. xlii. figs. 1, 1a): the case of *A. hippia*, however, is more interesting, as it exhibits, in a partial manner, a low type of venation in which two radial veins are present in place of one, and thus tends (so far as this character is concerned) to support Mr. Bates's view of the affinity of the *Papilionidæ* to the Heterocera: it would be still more interesting if it could be shown that the *Hesperiidæ* showed a greater tendency to reproduce the same vein.

The larva of *A. hippia*, judging from a nearly full-grown specimen preserved in spirit, presented by the Society to the Museum, has rather the aspect of some of the shorter-haired larvæ of the *Arctiidæ* than of what one would expect in the caterpillar of a butterfly; this, again, seems to point to a nearer relationship between the *Papilionidæ* and the Heterocera than one sees in the *Nymphalidæ*: the larva above referred to is of a dull flesh-colour, with lateral and dorsal series of conspicuous black spots, the head, first dorsal segment, and anal claspers black<sup>1</sup>, the third, fourth, and twelfth segments clothed with dense rust-red hair down to the lateral series of black spots, the second segment (first dorsal) and head clothed with stiff, porrected, greyish hairs, and the remaining segments with pale testaceous hair: the pupa is either bright gamboge-yellow or cream-coloured, mottled and spotted with black, in some specimens differing in no respect from that of *A. crataegi* in pattern, but frequently with the black markings united into bands and patches.

---

February 2, 1886.

Prof. W. H. Flower, LL.D., F.R.S., President, in the Chair.

Mr. W. B. Tegetmeier, F.Z.S., exhibited and made remarks upon a skin of a Pheasant from the Persian borders of Transcaucasia, which appeared to be referable to the true *Phasianus colchicus*.

---

Mr. C. A. Wright exhibited a specimen of a Dove from Malta, which seemed to be a semi-albino variety of *Turtur auritus*.

---

Mr. Sclater exhibited, on behalf of Mr. W. H. Dobie, 22 Upper Northgate Street, Chester, a young specimen of Sabine's Gull (*Xema sabinii*). Mr. Dobie stated that the bird had been shot at Mostyn on the coast of Flintshire, North Wales, in a field adjoining the shore, by Mr. John Williams, who watched it for some hours before he was able to obtain a shot. It was quite alone and did not

<sup>1</sup> In a beautiful coloured drawing submitted to me by Mr. Thomson, the claspers are represented as flesh-tinted at the sides, a probable variation.

accompany any other gulls; Mr. Williams indeed did not take it for a gull at all.

The date of its capture was not noted; it came into Mr. Thompson's hands November 1st, 1884, and had been then some days dead. It was therefore probably shot at the beginning of the last week in October. The sex was not ascertained.

---

Mr. Henry Seebohm exhibited a fully adult male of Ross's Gull (*Larus rossi*) which had been shot on the 15th of June, 1885, in the neighbourhood of Christianshaab on the south shore of Disco Bay in Greenland, about latitude 69°. It was shot at the nest, and both bird and egg were sent by Mr. Paul Müller to Copenhagen. The egg is of exactly the same character as that of Sabine's Gull (*Larus sabini*), but is rather larger, measuring 1.9 by 1.3 inch. Mr. Seebohm exhibited a coloured photograph of the egg, which has never been obtained before. The bird is so rare that the British Museum does not possess an example, though there is one in Edinburgh and one in Liverpool, from Melville Peninsula, and one in Cambridge, besides three in Copenhagen, the last four from Disco Bay. In the fully adult breeding bird the delicate salmon-colour of the head, rump, and under-parts, contrasting with the black ring round the neck, make it an exceptionally beautiful object. The bill is black, the legs and feet coral-red with black nails, and the orbits deep orange or pale vermilion.

---

A communication was read from Prof. R. Collett, C.M.Z.S., containing an account of the external characters of the Northern Fin-whale (*Balænoptera borealis*). This memoir had been based upon the examination of numerous specimens of this Whale killed on the coast of Norway during the past summer.

This paper will be published, with illustrations, in the Society's 'Transactions.'

---

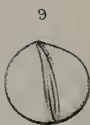
The following papers were read:—

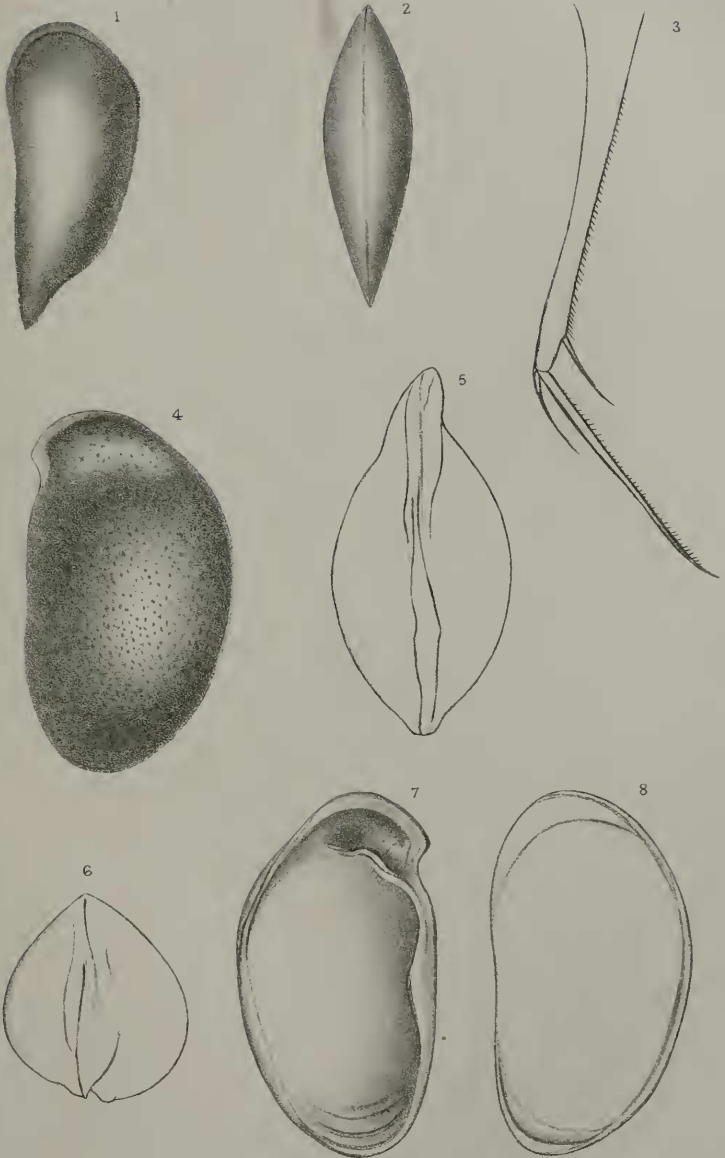
1. Notes on Freshwater Entomostraca from South Australia. By GEORGE STEWARDSON BRADY, M.D., F.R.S., F.L.S., Professor of Natural History in the Durham College of Science, Newcastle-upon-Tyne.

[Received January 5, 1886.]

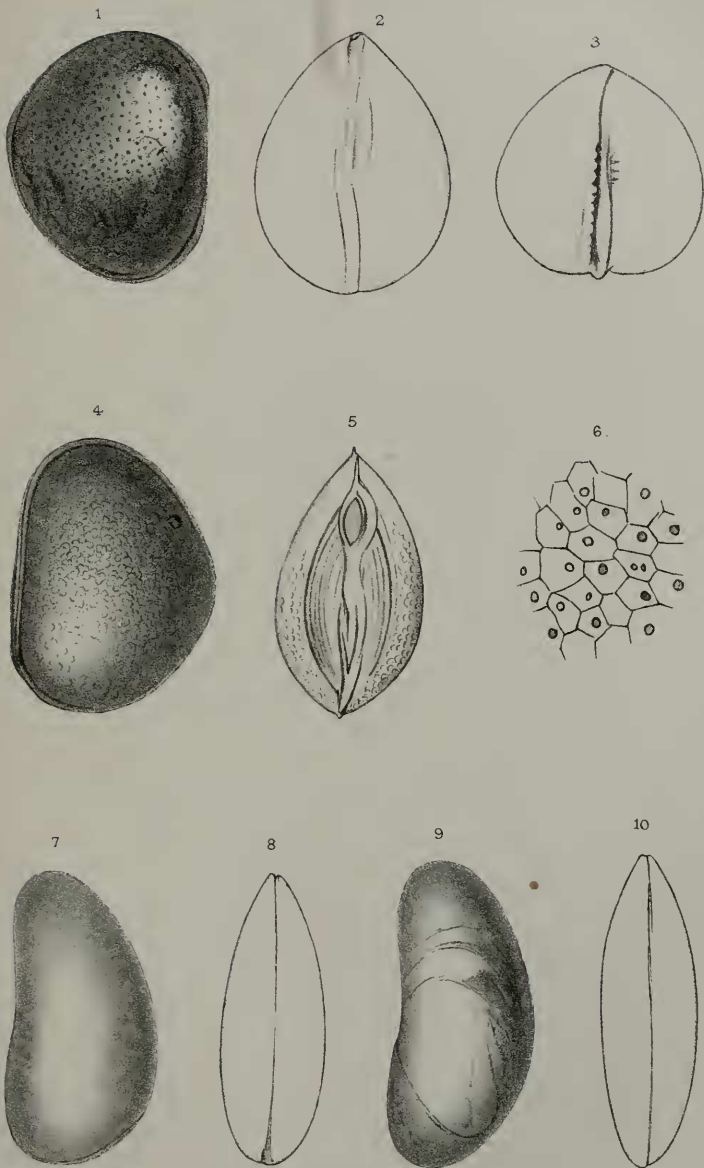
(Plates VIII.-X.)

The Entomostraca here described were collected by Professor Ralph Tate, of the University of Adelaide, South Australia, and by Mr. T. Steel. Prof. Tate's specimens were sent by him to Prof. T. Rupert Jones, F.R.S., to whose kindness I am indebted for the









opportunity of describing them. Those collected by Mr. Steel were submitted to me by Messrs. James Steel, of Glasgow, and Thomas Scott, of Greenock, to whom, as well as to Prof. Rupert Jones, my best thanks are due. I have had no opportunity of comparing these specimens with authenticated types of the species to which they are in some cases referred, but have had to depend entirely upon the published descriptions. The general likeness of these Australian Ostracoda to European freshwater forms is no more than might be expected; it is, indeed, rather remarkable that in no case do they come so near to any known European species as to be difficult of discrimination.

As the literature of the subject is not easily accessible, I give here a list of all the Australian freshwater Entomostraca which have been described up to the present time:—

#### PHYLLOPODA.

- Lepidurus viridis*, Baird, P. Z. S. 1850. Van Diemen's Land.  
*Lepidurus angasii*, Baird, P. Z. S. 1866. Adelaide, South Australia.  
*Lepidurus viridulus*, Tate, Proc. Roy. Soc. Austr. 1878-9. Adelaide, South Australia.  
*Limnadia stanleyana*, King, Papers & Proc. Roy. Soc. Van Diemen's Land, vol. iii. pt. i. 1855. New South Wales.  
*Limnadia sordida*, King, *ibidem*. New South Wales.  
*Limnetis macleayana*, King, *ibidem*. New South Wales.  
*Artemia proxima*, King, *ibidem*. New South Wales.  
*Estheria birchii*, Baird, P. Z. S. 1860. Wanoi River, Australia.

It may be well to note that two New-Zealand Phyllopoda (*Lepidurus kirki* and *L. compressus*) have been described by Prof. Thomson in the Transactions of the New Zealand Institute, vol. xi. p. 260, pl. ii. fig. E, 4, 5.

The following Cladocera, found living in New South Wales, are described and figured by the Rev. R. L. King in the 'Papers and Proceedings of the Royal Society of Van Diemen's Land,' vol. ii. pt. 2, 1853, and vol. iii. pt. 1, 1855:—

<i>Daphnia carinata</i> , King.	<i>Chydorus leonardi</i> , King.
— <i>elizabethæ</i> , King.	— <i>angustus</i> , King.
— <i>honorata</i> , King.	<i>Alona bairdii</i> , King.
— <i>mueronata</i> , Müller.	— <i>pulchella</i> , King.
<i>Macrothrix spinosa</i> , King.	— <i>diaphana</i> , King.
<i>Moina lemnæ</i> , King.	— <i>karua</i> , King.
— <i>macleayii</i> , King.	— <i>mascula</i> , King.
<i>Eurycerus spinosa</i> , King.	<i>Dunhevedia crassa</i> , King.
— <i>cookii</i> , King.	— <i>podagra</i> , King.
— <i>cunninghami</i> , King.	

Also by the same writer the following Copepoda, from South Australia, are mentioned or briefly described, *ibid.* vol. iii. pt. 1, 1855:—

- Cyclops australis*, King.  
*Diaptomus pollux*, King.  
 — *uxorius*, King.  
 — *maria*, King.  
 — *cookii*, King.

And, in the same work, vol. iii. pt. 1, 1855, the following South-Australian Ostracoda are described and figured :—

*Cypris carinata*, King.  
 — *stobarti*, King.  
 — *bennelong*, King.  
 — *clarkii*, King.  
 — *scottii*, King.  
 — *minna*, King.  
 — *lateraria*, King.  
 — *sydneia*, King.

*Cypris candonoides*, King.  
 — *varrovillia*, King.  
*Candona stanleyana*, King.  
 — *lutea*, King.  
*Newnhamia* (*Notodromas*)  
*fenestrata*, King.  
 — *gulielmi* (?), King.

The species now described and figured are the following :—

*Limnetis tatei*, nov.  
*Eulimnadia rivolensis*, nov.  
*Lepidurus viridulus*, Tate.  
*Estheria lutraria*, nov.  
 — *packardii*, nov.  
*Cypris viridula*, nov.  
 — *stanleyana*, King.  
 — *tatei*, nov.

*Cypris mytiloides*, nov.  
*Chlamydotheca australis*, nov.  
*Cypridopsis minna*, King.  
 — *funebis*, nov.  
*Notodromas fuscatus*, nov.  
*Candona lutea*, King.  
 — *tenuis*, nov.

## Order PHYLLOPODA.

### Family LIMNADIADÆ, Baird.

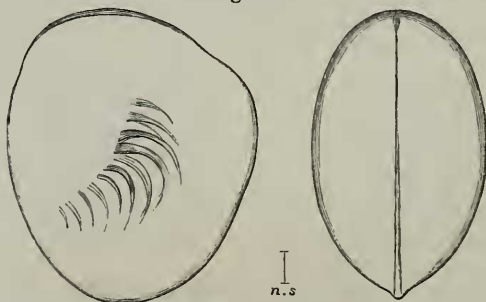
#### Subfamily LIMNETINÆ, Packard.

#### Genus LIMNETIS, Lovén.

*LIMNETIS TATEI*, n. sp. (Fig. A.)

Shell smooth, subspherical. Seen from the side it is broad and

Fig. A.



*Limnetis tatei*.

subtruncate in front, narrower and rounded behind; the dorsal margin is but slightly arched; ventral convex, with a considerable protuberance toward the front; seen dorsally, the outline is broadly

oval, the width equal to more than half the length, broadly rounded behind, subacuminate in front. The shell is granular in structure, without any concentric ridges. Length  $\frac{1}{5}$  of an inch, height  $\frac{1}{6}$ , width  $\frac{1}{8}$ .

*Hab.* Freshwater pools, Rivoli Bay, South Australia (*Prof. R. Tate*).

Subfamily ESTHERIANÆ, Packard.

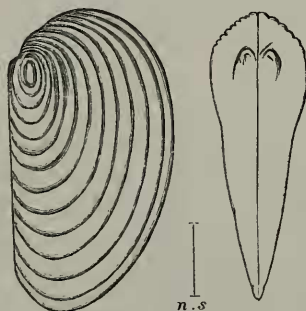
Genus ESTHERIA, Rüppell.

1. ESTHERIA LUTRARIA, n. sp. (Fig. B.)

Valves oblong, compressed, membranous; beak near the anterior extremity, lines of growth about twelve; seen laterally, the dorsal line is quite straight, ventral convex, anterior extremity broadly rounded, posterior narrowed and somewhat oblique; seen from above it is much compressed behind the middle, and sharply pointed at the extremity; broadly rounded in front. Colour yellowish brown. Length  $\frac{7}{16}$  of an inch; height  $\frac{4}{16}$ .

*Hab.* Cooper Creek, at Innaminka, Central Australia (*Prof. R. Tate*).

Fig. B.



*Estheria lutraria.*

*Prof. Tate's* specimens include only a single example of this species—a dried empty shell; apparently somewhat shrunk and distorted. The specific name refers to the Molluscan genus *Lutraria*, which it rather closely resembles.

2. ESTHERIA PACKARDI, n. sp. (Fig. C.)

Valves, seen laterally, subelliptical, beak prominent and situated near the anterior extremity, extremities rounded, the anterior much the wider of the two, dorsal margin straight in the middle, ventral convex; lines of growth 12–15, not sharply marked. Shell rather

Fig. C.

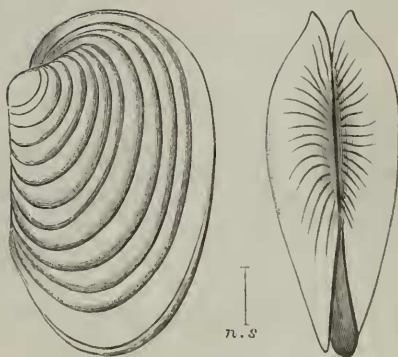
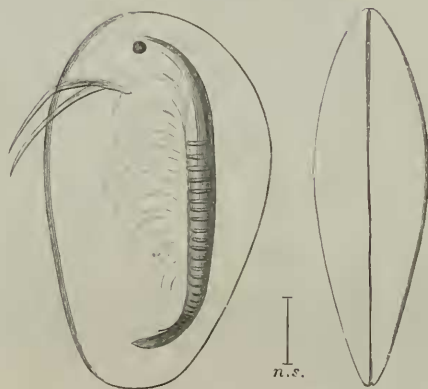
*Estheria packardii.*

Fig. D.

*Eulimnadia rivulensis.*

hard and dense, dark brown (one of the specimens has a broad white marginal band). Length  $\frac{5}{16}$  of an inch; height  $\frac{3}{16}$ .

*Hab.* Lake Bonney, River Murray, South Australia; also Fowler Bay, Great Australian Bight (*Prof. R. Tate*).

Genus *EULIMNADIA*, Packard.

(*Limnadia*, Brongniart, in part.)

*EULIMNADIA RIVOLENSIS*, n. sp. (Fig. D.)

Shell membranous, without any lines of growth; seen from the side, subovate, highest toward the front; anterior extremity broadly rounded, posterior narrow, very slightly rounded; dorsal margin well arched, almost gibbous, ventral slightly convex; the dorsal aspect is compressed, ovate, more than thrice as long as broad, tapered and acuminate behind, somewhat more obtuse in front. Length  $\frac{3.6}{100}$  of an inch; height  $\frac{2.2}{100}$ , width  $\frac{1.0}{100}$ .

Very similar to *Limnadia antillarum*, Baird, but much larger; differs also in having the eye near the middle of the anterior margin instead of near the dorsal angle, in being without any distinct lines of growth, and in having an evenly rounded (not angulated) anterior margin. This species was found by Prof. R. Tate in company with *Limnetis tatei*.

Inside the valves of a specimen of this *Eulimnadia* I found on dissection a large colony of a protozoon, possibly *Arcella dentata*, Ehrenberg, at any rate very closely resembling that species, as figured by Professor Leidy.

Family APODIDÆ, Burmeister.

Genus *LEPIDURUS*, Leach.

*LEPIDURUS VIRIDULUS*. (Fig. E, p. 88.)

*Lepidurus viridulus*, Tate, Trans. & Proc. Philosoph. Soc. Adelaide (1879), p. 136.

"Animal, including flap of tail-segment, about an inch long, carapace rounded, elongate-oval, of a brownish-green colour, covering the whole abdomen excepting flap of tail-segment; keeled toward the extremity, ending in an acute point, lunately notched posteriorly, and sharply and conspicuously hooked on its margin. Front and lateral margins of the carapace smooth and thickened. The rings of the abdominal segments, dark brown, are beset with stout spines equidistantly placed all round and directed backwards. The flap of the tail-segment has a blunt keel along its whole length, with blunt prominences, and its edges are ciliate serrated. The filaments of the tail are about half the length of the body, and are clothed with fine cilia.

"*Hab.* Collected by Thomas Tate, October 1878, in the floodwaters of the 'Reedbeds,' near Adelaide.

"Two Australian species of the genus have been described. *L. viridis*, so called from its colour, inhabits Tasmania, and was diagnosed

by Dr. Baird (Proc. Zool. Soc. 1850, p. 254); and *L. angasi* of the same author, 1866, which is of a pale horny colour, and is common in the rain-pools about Adelaide. *L. viridis* is characterized by its fine green colour, by its oval carapace covering less of the body than in *L. angasi*, and the edges of the lower half of its length being serrated; *L. angasi* is distinguished by its horny colour, its rounded carapace

Fig. E.

*Lepidurus viridulus.*

covering nearly two thirds of the body, and by the smooth edges of the sides of the carapace.

"*L. viridulus* differs from *L. angasi* in colour, in the carapace covering more of the abdomen, its keel limited to the hinder part and in the narrower and more spatulate tail-flap."—Trans. & Proc. & Report of the Philosophical Society of Adelaide, South Australia, for 1878–9, p. 136 (published 1879), afterwards called the Royal Society of South Australia.

#### Order OSTRACODA.

#### Family CYPRIDIDÆ.

#### Genus CYPRIS, Müller.

#### 1. CYPRIS VIRIDULA, n. sp. (Plate VIII. figs. 1, 2.)

"Carapace oblong, compressed, reniform, greatest height situated in the middle, and somewhat less than half the length; seen from the side the extremities are well rounded, the anterior somewhat the narrower of the two, dorsal margin almost flat or very slightly arched, ventral sinuated in the middle; seen from above, compressed, ovate, twice as long as broad, widest in the middle, gradually tapered towards the anterior extremity, which is subacuminate, posterior extremity narrowed and rounded; surface smooth and polished, the



anterior half marked with a fine reticulated sculpture, colour greenish, clouded with bands of a darker shade. Length  $\frac{1}{20}$  of an inch.

Collected by Mr. Thomas Steel at Condong, on the Tweed River, near Sydney, New South Wales.

2. *CYPRIS STANLEYANA* (King). (Plate VIII. figs. 3, 4.)

*Candona stanleyana*, King, 1855, Pap. Proc. R. Soc. Van Diemen's Land, vol. iii. pt. 1, p. 66, pl. x. H.

This is very much like *C. viridula*, but the height is somewhat less, the dorsum is more decidedly arched, and the extremities are less obliquely rounded. The surface is marked everywhere with fine, very closely set, and deep longitudinal grooves. Colour light green, slightly clouded. Length  $\frac{1}{20}$  of an inch.

Taken in the same gathering as the preceding species. Mr. King refers this to the genus *Candona*; but the lower antenna is provided with a brush of setæ reaching about to the extremity of the terminal claws.

3. *CYPRIS TATEI*, n. sp. (Plate VIII. figs. 5, 6.)

Shell, seen from the side, broadly reniform, greatest height in the middle, and equal to more than half the length; extremities rounded, dorsal margin boldly arched, sloping abruptly behind, more gradually towards the front, ventral deeply sinuated in the middle; seen from above, the outline is ovate, somewhat compressed in front, widest behind the middle, anterior extremity subacuminate; posterior wide and rounded; valves unequal, that of the right side the larger. Surface smooth, colour yellowish brown, with darker clouded markings. Length  $\frac{1}{15}$  of an inch.

Taken by Prof. R. Tate in "brackish pools in a dry creek at Adelaide."

This species, though considerably more tumid, has very much the general character of *C. prasina*, Fischer (*fretensis*, Brady & Robertson), and of *C. incongruens*, Ramdohr, especially as to the curiously compressed anterior extremity. It is remarkable, too, that all of these are inhabitants, almost exclusively, of brackish water. I have pleasure in naming the species after Prof. Ralph Tate, by whom it was found, and to whose kindness I am indebted for the opportunity of describing it.

4. *CYPRIS MYTILOIDES*, n. sp. (Plate IX. figs. 1-3.)

Shell, seen laterally, elongated, siliqueose, highest in front, produced behind into a very acute, tapering beak; height equal to less than one half the length; anterior extremity broad and boldly rounded, dorsal margin boldly arched, highest near the front, thence sloping at first with a gentle curve, but more abruptly towards the posterior extremity, in front of which it is deeply sinuated; ventral margin almost straight, with a slight median sinuation; seen from above, compressed, oblong, widest near the middle, about thrice and a half as long as broad; extremities acute, the posterior the more

slender of the two. The right valve is the smaller of the two, and has the dorsal margin less arched. The inner aspect of the valves shows a large shelf-like flange fore and aft. The terminal claws of the second pair of antennæ are slender and finely pectinated on the inner margin. Postabdominal rami slender, with one long terminal claw, one short seta at the base of the claw, and one a little removed on the margin of the ramus. Margins of claws and ramus minutely pectinated. Shell thin, horny, of a smoky hue. ("Colour in life light-brown, with darker zebra-like markings." *Prof. R. Tate*.) Length  $\frac{1}{5}$  of an inch.

Collected by Prof. R. Tate in fresh water, at Kangaroo Island, Australia.

Though quite abnormal in shape of shell, the soft parts of the animal agree in every important respect with those of the genus *Cypris*.

#### Genus CHLAMYDOTHECA, de Saussure<sup>1</sup>.

"Testa unique pilosa, antice posticeque rotundata, appendice anteriore cum margine valvulæ dorsali sensim coalescente, cum margine ventrali autem angulum manifestum efficiente; appendice posteriore minima. Altitudo maxima pone medium et propius ventralem quam dorsalem marginem sita, exinde pars postica crassior quam antica. Margo ventralis vix sinuata, dorsalis valde armata. Impressio muscularis paulo ante medium sita."

The anatomical structure agrees exactly with *Cypris*. The author (de Saussure) refers to a paper by Sir John Lubbock, in which a similar species, *Cypris brasiliensis*, is described<sup>2</sup>.

The genus *Cypridea*, Bosquet<sup>3</sup>, if not identical with, is at least very nearly allied to, the forms now under discussion. No undoubted recent specimens of *Cypridea* have, however, as yet been seen, and Prof. Rupert Jones, in a recent paper "On the Ostracoda of the Purbeck Formation,"<sup>4</sup> says that the "hinder margin is definitely straight along the middle third or more of the dorsal edge, with the hinge-angles more or less defined, and is oblique to the main axis of the valve. The left valve is the largest, and receives the dorsal edge and a straight ridge of the other valve in grooves on its dorsal and ventral contact-margins." These characters are not to be found in *Chlamydotheca*. Moreover, from the figures given by Prof. Rupert Jones, it seems that both valves of *Cypridea* are provided with the notch and hatchet-like anterior process, whereas in *Chlamydotheca* only the left valve is so formed.

<sup>1</sup> "Mémoire sur divers Crustacés nouveaux des Antilles et du Mexique," par M. Henri de Saussure. (Mémoires de la Société de Physique et d'Histoire Naturelle de Genève, 1856.)

<sup>2</sup> "On the freshwater Entomostraca of South America." (Trans. Entom. Soc. Lond. new series, vol. iii. part vi. 1855.)

<sup>3</sup> "Entom. fossil. des Terrains tertiaires de la France et de la Belgique." (Mém. couronnés Acad. Royal de Belgique, vol. xxiv. 1852.)

<sup>4</sup> "Ostracoda of the Purbeck Formation, with notes on the Wealden species." (Quarterly Journal of the Geological Society, August 1885.)

## CHLAMYDOTHECA AUSTRALIS, n. sp. (Plate IX. figs. 4-8.)

Shell, seen from the side, subovate, greatest height equal to rather more than half the length, and situated in the middle, anterior extremity rounded, produced at the inferior angle so as to form a ventral beak, posterior extremity narrower, rounded, dorsal margin boldly arched, ventral slightly sinuated in the middle, more deeply in front, behind the beak; seen from above, the outline is ovate, twice as long as broad, anterior extremity forming a large, broad, obtusely-pointed, and twisted prominence, posterior slightly narrowed and produced, but rounded off. The valves are unequal, the left being the larger, overlapping on the ventral, and less distinctly on the dorsal margin. The outline of the right valve is more evenly rounded than that of the left, presenting no ventral beak nor sinuation, nor are the margins, either ventral or dorsal, so much incurved; the inner aspect of the valves shows shelving flanges both before and behind, and in that of the left side there is a curious twisted ridge separating the anterior beaked portion from the body of the shell. The substance of the shell is rather thick; surface closely marked with small circular impressions; colour fuscous. Length  $\frac{1}{13}$  of an inch. The specimens are all empty shells, so that the structure of the soft parts is as yet unknown.

Penola (*Prof. R. Tate*).

## Genus CYPRIDOPSIS, Brady.

## 1. CYPRIDOPSIS MINNA (King). (Plate X. figs. 1-3.)

*Cypris minna*, King, 1855, Pap. Proc. R. Soc. Van Diemen's Land, vol. iii. pt. i. p. 64, pl. x. B.

Shell very tumid; width and height about equal, length about one fourth greater. Seen from the side, subcircular, highest in the middle, extremities broadly rounded, dorsal margin excessively arched, ventral nearly straight in the middle; seen from above very broadly ovate, obtusely pointed in front, the hinder part forming almost a complete circle; end view subcircular, obscurely pointed above, slightly keeled and emarginate below. Surface smooth, beset with small impressed circular puncta; colour olivaceous, clouded irregularly with darker patches. Anterior margins of the valves slightly crenulated. Length  $\frac{1}{25}$  of an inch.

*Hab.* Condong River, Australia (*Mr. T. Steel*). "Ponds, everywhere" (*Rev. R. L. King*).

## 2. CYPRIDOPSIS FUNEBRIS, n. sp. (Plate VIII. figs. 7-9.)

Shell, seen from the side, subtriangular; greatest height a little in front of the middle and equal to nearly two thirds of the length; extremities rounded, the anterior wide, posterior narrower and not so well rounded, dorsal margin elevated and almost gibbous near the middle, thence sloping almost in a straight line backwards, and with a gentle curve towards the front, ventral almost straight; seen from above, ovate, widest in the middle, width equal to two thirds of the

length, anterior extremity obtuse, scarcely rounded, posterior rounded off and rather wider than the front. End view subcircular. Surface smooth, cream-coloured, with transverse black bands after the manner of *C. vidua*. Length  $\frac{1}{50}$  of an inch.

*Hab.* Condong, Tweed River, New South Wales (*Mr. T. Steel*).

#### Genus NOTODROMAS, Lilljeborg.

(*Newnhamia*, King, 1855, Pap. Proc. R. Soc. Van Diemen's Land, vol. iii. pt. 1, p. 67.)

#### NOTODROMAS FUSCATUS, n. sp. (Plate X. figs. 4-6.)

Shell, seen laterally, subtriangular, height equal to three fourths of the length, extremities very broadly rounded, the anterior somewhat the narrower of the two, dorsal margin excessively arched, highest a little behind the middle; ventral nearly straight; seen from above, the outline is ovate, scarcely twice as long as broad, tapered and acuminate in front, rounded off behind. Surface of the valves somewhat rough and furfuraceous, colour brownish, with darker cloudings. The ventral aspect of the shell is ribbed almost exactly as in *N. monachus*; the "ocular" tubercle is large and distinct; by transmitted light the shell is seen to have a polygonal reticulated structure, and the reticulations are visible also by reflected light on the anterior portion of the valves.

*Hab.* At Condong, with the foregoing species.

This is very much less tumid and less angular in outline than *Newnhamia fenestrata*, King, and its lateral outline differs in the same way from *Notodromas monachus*, Müller.

#### Genus CANDONA, Baird.

#### 1. CANDONA LUTEA, King. (Plate X. figs. 7, 8; &? Plate VIII. figs. 10, 11.)

*Candona lutea*, King, 1855, Pap. Proc. R. Soc. Van Diemen's Land, vol. iii. pt. i. p. 67 pl. x. k.

*Male.* Shell, seen from the side, subreniform, depressed in front, greatest height near the posterior extremity and equal to half the length; anterior extremity narrow and well rounded, posterior wide, obliquely rounded; dorsal margin forming a flattened arch, sloping with a gentle curve to the front, and abruptly backwards, ventral sinuated in the middle; seen from above, compressed, ovate, about thrice as long as broad, gently tapered towards the front, which is subacuminate, rounded off behind. Shell smooth and polished, pellucid, white or straw-coloured. Length  $\frac{1}{24}$  of an inch.

*Hab.* Condong, with the foregoing species.

The shell figured in Plate VIII. figs. 10, 11, occurred in the same gathering, and possibly may be the young of *C. lutea*.

#### 2. CANDONA TENUIS, n. sp. (Plate X. figs. 9, 10.)

Shell elongated, compressed, reniform; seen from the side it is at least twice as long as broad, the greatest height being a little behind the middle, extremities rounded, dorsal margin boldly arched, ventral

deeply sinuated in the middle; the dorsal view is elongated, ovate, quite thrice as long as broad, widest in the middle; extremities narrowed, the anterior subacuminate, posterior rounded off; left valve rather larger than the right. Shell smooth, pellucid, cream-coloured, with opaque cloudings. Length  $\frac{1}{2}$  of an inch.

Taken in company with the preceding species.

#### EXPLANATION OF THE PLATES.

##### PLATE VIII.

- |         |  |                      |                 |
|---------|--|----------------------|-----------------|
| Fig. 1. | <i>Cypris viridula</i> (p. 88),        | seen from left side. | } $\times 40$ . |
| 2.      | " "                                    | seen from above.     |                 |
| 3.      | " <i>stanleyana</i> (p. 89),           | seen from left side. |                 |
| 4.      | " "                                    | seen from above.     |                 |
| 5.      | " <i>tatei</i> (p. 89),                | seen from left side. | } $\times 20$ . |
| 6.      | " "                                    | seen from below.     |                 |
| 7.      | <i>Cypridopsis funebris</i> (p. 91),   | seen from left side. | } $\times 40$ . |
| 8.      | " "                                    | seen from above.     |                 |
| 9.      | " "                                    | seen from front.     |                 |
| 10.     | <i>Candona lutea</i> , jun. ? (p. 92), | seen from left side. | } $\times 80$ . |
| 11.     | " "                                    | seen from above.     |                 |

##### PLATE IX.

- |         |   |                               |                 |
|---------|---|-------------------------------|-----------------|
| Fig. 1. | <i>Cypris mytiloides</i> (p. 89),       | seen from left side.          | } $\times 6$ .  |
| 2.      | " "                                     | seen from above.              |                 |
| 3.      | " "                                     | postabdominal ramus.          | $\times 40$ .   |
| 4.      | <i>Chlamydotheca australis</i> (p. 91), | seen from left side.          | } $\times 28$ . |
| 5.      | " "                                     | seen from below.              |                 |
| 6.      | " "                                     | seen from front.              |                 |
| 7.      | " "                                     | left valve seen from inside.  |                 |
| 8.      | " "                                     | right valve seen from inside. |                 |

##### PLATE X.

- |         |                                      |                       |                 |
|---------|--------------------------------------|-----------------------|-----------------|
| Fig. 1. | <i>Cypridopsis minna</i> (p. 91),    | seen from right side. | } $\times 40$ . |
| 2.      | " "                                  | seen from below.      |                 |
| 3.      | " "                                  | seen from front.      |                 |
| 4.      | <i>Notodromas fuscatus</i> (p. 92),  | seen from left side.  | } $\times 40$ . |
| 5.      | " "                                  | seen from below.      |                 |
| 6.      | " "                                  | shell structure.      | $\times 400$ .  |
| 7.      | <i>Candona lutea</i> , male (p. 92), | seen from left side.  | } $\times 40$ . |
| 8.      | " "                                  | seen from above.      |                 |
| 9.      | " <i>tenuis</i> (p. 92),             | seen from left side.  |                 |
| 10.     | " "                                  | seen from above.      |                 |

## 2. Contribution to a Knowledge of the South-Italian Chiroptera. By FR. S. MONTICELLI, D.Sc. (Communicated by Dr. H. WOODWARD, F.R.S., F.G.S.)

[Received January 5, 1886.]

Bonaparte<sup>1</sup> was the first naturalist who wrote upon Italian Chiroptera; but his researches are too general, and there are no indications of southern localities contained in his work.

Later on, Prof. C. G. Costa gave in 1839<sup>2</sup> a catalogue of

<sup>1</sup> 'Iconografia della Fauna Italica'; Roma, 1832-41.

<sup>2</sup> 'Elenco dei Mammiferi e Supplemento.' (Fauna del Regno di Napoli.)

Chiroptera of the kingdom of Naples; but after him, excepting Major<sup>1</sup>, who announced the discovery of *Vesperugo leisleri* in South Italy, no one else has written about the Chiroptera of this country. Quite recently, however, Camerano and Lessona<sup>2</sup> have given notices of some of the Southern species. Prof. Costa's work in 1839 enumerates the following species:—*Rhinolophus bihastatus*, *Vesperugo serotinus*, *Vespertilio bechsteini*, *Vespertilio murinus*, *Dysopes cestoni*, *Plecotus auritus*, and *Myopterus daubentoni*. From this catalogue of Costa must be excepted *V. bechsteini*, which I have not yet met with, and *Myopterus daubentoni*, which is not a European species; but there are to be added thirteen other species, so that the number of Chiroptera of South Italy now consists of at least eighteen species. Amongst the thirteen species to be added to the catalogue of Costa there are many very important as regards the geographical distribution of the different species in Italy; such as *Synotis barbastellus*, which so far has only been found in Northern Italy; and also a species altogether new to Italy, which I have recently described as *Vespertilio oxygnathus*.

I am preparing descriptions, carefully compiled, of all the South-Italian Chiroptera; but for the present I give this preliminary catalogue of them, with indications of the localities where they are found.

#### 1. NYCTINOMUS CESTONI, Savi.

This species does not seem to be common in the South, but it is not rare at Naples. I have not been able to procure specimens from other points of the Mediterranean side of Italy, but it is possible that it may be found on the Adriatic side, where so far no researches have been made.

#### 2. RHINOLOPHUS FERRUM-EQUINUM, Schr.

This species is very common, and easy to find anywhere.

#### 3. RHINOLOPHUS EURYALE, Blas.

Although Camerano and Lessona say this species is less common than the preceding, and is found particularly in North Italy, I have also found it equally distributed in South Italy.

#### 4. RHINOLOPHUS HIPPOSIDEROS, Bechst.

Less common than the preceding, but not rare. I have not met with *R. blasii*, Peters, although Blasius says that he found it in Middle and Southern Italy and Sicily, and Camerano obtained it in Sardinia.

#### 5. MINIOPTERUS SCHREIBERSI, Natt.

Very common throughout the whole of South Italy.

<sup>1</sup> "Vertebrati Italiani nuovi o poco noti": Atti Soc. Tosc. Natur. Pisa, vol. iii. 1876.

<sup>2</sup> 'Compendio della Fauna Italiana': Torino, Loescher, 1885.

6. *PLECOTUS AURITUS*, Linn.

This Bat seems to be more common on the Adriatic than on the Mediterranean side of Italy.

7. *SYNOTUS BARBASTELLUS*, Schreb.

This species has been hitherto said to be found only in North Italy. It occurs also in South Italy.

8. *VESPERUGO (VESPERUS) SEROTINUS*, Schr.

This species is not very frequently observed, but is found everywhere.

9. *VESPERUGO NOCTULA*, Schr.

Not common in South Italy, but not rare. Up to the present time it has been found only on the Adriatic side.

10. *VESPERUGO LEISLERI*, Kuhl.

A very rare species in Italy. There are only two specimens in the Museum of Florence, which were obtained in the province of Lecce.

11. *VESPERUGO SAVII*, Bp.

This Bat is very common everywhere.

12. *VESPERUGO KUHLI*, Natt.

Very common everywhere; found both in town and country. There are many variations in the colour and size of specimens; I have found some all white, and others black. These may be considered as two distinct varieties: the former I call "var. *albicans*," the latter "var. *pullatus*."

13. *VESPERUGO PIPISTRELLUS*, Schreb.

A species common everywhere. In some places it is met with in great numbers.

14. *VESPERTILIO BLASII*, Major.

*Vespertilio majori*, Ninni, Fauna Venet.<sup>1</sup>

Up to the present time a very rare species. I have seen only one specimen, which is in the collection of the Zoological Museum of Naples.

15. *VESPERTILIO MURINUS*, Linn.

Generally distributed over the whole of Southern Italy.

16. *VESPERTILIO OXYGNATHUS*, Mont.<sup>2</sup>

I have founded this new species on specimens found at Matera (province of Basilicata). It is very closely allied to *V. murinus*, but is at once distinguished by the ears, which are as long as the head, the great development of the glands of the muzzle, by the

<sup>1</sup> 'Materiali per una Fauna Veneta': Venezia, 1878; Atti R. It. Venet.

<sup>2</sup> Ann. Acc. Or. Costa d. Asp. Natur. Era 3, vol. i., con tavola.



acutely pointed muzzle, and the prominent nostrils, which open sublaterally, as also by the small upper premolar, the form of the ear, the tragus with a distinct lobe at the base of outer margin, and by its small feet.

The wing-membrane does not extend so far outwards along the foot, and its colour is darker.

This new species has also many characters common with *V. africanus*, Dobson, *V. dobsoni* (*murinoides*), and *V. chinensis*.

#### 17. *VESPERTILIO EMARGINATUS*, Geoffr.

In the Museum of Florence there are many specimens of this species found in different localities of South Italy, but I have not succeeded in procuring other specimens.

#### 18. *VESPERUGO NATTERERI*, Kuhl.

This species does not seem to be very common. I know of only two specimens from the South.

The following Italian species of Chiroptera I have not yet found in the South :—

1. *Rhinolophus blasii*, Blas.
2. *Vesperugo nathusii*.
3. *Vesperugo discolor*.
4. *Vesperugo leucippe*.
5. *Vespertilio daubentoni*.
6. *Vespertilio mystacinus*.
7. *Vespertilio bechsteini*.

Naples, Nov. 1885.

### 3. Notes on Specimens in the Hume Collection of Birds.

By R. BOWDLER SHARPE, F.L.S. &c.

#### No. 1. On the Hawfinch from Attock.

[Received January 14, 1886.]

Three specimens of a Hawfinch were collected at Attock in the Punjab, in March 1869, and in February 1870, by Colonel Delmé-Radcliffe. They are mentioned by Mr. Hume in 'The Ibis' for 1869, p. 456, and again in 'Stray Feathers' for 1877, vol. vii. pp. 413, 462, and are there referred to *C. vulgaris*, i. e. *C. coccothraustes* (Linn.). In the Hume Collection there were no specimens of true *C. coccothraustes* from Europe; and the comparison of these specimens was therefore doubtless made with plates of the European bird; but on comparing the three birds with a series of true *C. coccothraustes*, it seems to me certain that they are distinct from the European Hawfinch.

The female differs from the corresponding sex of *C. coccothraustes* in being ochreous brown above, pale ashy ochreous on the lower

back, rump, and upper tail-coverts, while *the crown of the head is ashy grey like the hind neck*; sides of face also ashy grey washed with ochreous; breast and sides of the body ochreous buff, instead of vinaceous brown; centre of breast and abdomen white. Total length 6·75 inches, culmen 0·75, wing 3·9, tail 2·35, tarsus 0·8.

The male differs less from *C. coccothraustes* than the female, but it is distinguished by its paler coloration, and by the breast and sides of the body being light orange-brown instead of vinaceous. Total length 6·9 inches, culmen 0·8, wing 3·8, tail 2·1, tarsus 0·8.

I may add that the Attock bird is not *C. japonicus*, for it has a greater extent of pure white on the wing-coverts than in even true *C. coccothraustes*. *C. japonicus* is scarcely to be distinguished from the European bird; and differs only in having the median and greater wing-coverts pale drab at the ends instead of white. I propose to call the *Coccothraustes* from Attock after my friend Mr. Hume, *C. humii*. Whether it is the Hawfinch recorded by Lieut. Barnes as a permanent resident at Chaman in Southern Afghanistan (Str. F. ix. p. 456) must remain a question to be decided by an examination of specimens, which I have not yet had the opportunity of doing.

#### 4. Preliminary Notice of the Isopoda collected during the Voyage of H.M.S. 'Challenger.'—Part III. By FRANK E. BEDDARD, M.A., F.R.S.E., F.Z.S., Prosector to the Society<sup>1</sup>.

[Received January 25, 1886.]

The present paper completes the preliminary description of the new species of Isopoda collected during the voyage of the 'Challenger.' This paper includes the families *Munnidae*, *Asellidae*, *Arcturidae*, *Cymothoidae*, *Sphaeromidae*, *Tanaidae*, *Anceidae*, and *Anthuridae*, of all of which there are specimens in the 'Challenger' collection, representing about 45 new species, besides a number of others previously known. Among the shallow-water species the largest number of new forms are from Kerguelen, in spite of the investigations into the marine fauna of that region carried out by the British 'Transit of Venus Expedition,' and the exploring voyage of the German S.S. 'Gazelle.' I have to add quite as many new species as those previously known to the fauna of Kerguelen and the adjacent islands (Prince Edward's Island, &c.).

Among the deep-sea species the most remarkable and interesting is undoubtedly a new genus of *Cymothoadae*, which is described below under the name of *Anuropus branchiatus*; there are also numerous representatives of other deep-sea forms, as might be expected from the nature of the explorations carried out by the 'Challenger.'

<sup>1</sup> Published by permission of the Lords Commissioners of the Treasury.  
PROC. ZOOL. SOC.—1886, No. VII.

## Fam. MUNNIDÆ.

## Genus MUNNA, Kröyer.

## 1. MUNNA MACULATA, n. sp.

A single male example of this species was dredged in shallow water at Kerguelen. It measures about 4 millim. in length. The body is smooth, and the integument has numerous black pigment-spots. The shape of the body is characteristically that of a female, being broader anteriorly than posteriorly; the head is about as long as the first two segments of the thorax; the anterior margin is straight and fringed with a row of stiff hairs; the eye-stalks are well developed. The four anterior segments of the thorax are subequal; the three posterior are narrower; the thoracic segments have short rounded epimera. The *antennules* consist of a four-jointed peduncle, the two distal joints of which are much shorter than the proximal joint; the flagellum consists of four joints, which are elongated and narrow. The antennæ are very long, about twice the length of the body; the flagellum is shorter than the peduncle: the last two joints of the peduncle are elongated and subequal.

Kerguelen, 25 fathoms.

## 2. MUNNA PALLIDA, n. sp.

This species, like the last, is represented by a single male specimen, measuring rather less than 3 millim. Like other species, the male is of approximately uniform diameter throughout. The species is pale and transparent, without any trace of pigment. The head terminates in a truncated anterior margin; the eyes are sessile—not stalked. The first segment of the thorax is longer than any of the three following, which are subequal; their margins are rounded and furnished with small rounded epimera; the three posterior segments are curved backwards; the first is very short, the rest increase slightly in length progressively. The abdominal shield is oval, ending in an obtusely rounded extremity. The *antennules* are like those of the last species, but the flagellum is only three-jointed.

Kerguelen, 30 fathoms.

## Genus ISCHNOSOMA, Sars.

## 1. ISCHNOSOMA BACILLUS, n. sp.

This species is only represented by a single fragment, including the abdomen and four last thoracic segments, which is, however, sufficient to determine with at least probability its systematic position; it measures 10 millim. The fourth and fifth segments of the thorax, as in Sars's species, are closely connected and form an hourglass-shaped structure, the two pairs of appendages belonging to these segments being placed at each extreme of the conjoined segments. The fourth and fifth segments are each provided with long spine-like epimera. The presence of spines upon the fifth segment of the thorax distinguishes this species from both *I. bispinosum* and *I. quadri-*

*spinosum*, and from the next species *I. bacilloides*. The specimen is a female.

Station 158 ; 1800 fathoms.

## 2. *ISCHNOSOMA BACILLOIDES*, n. sp.

This species is closely allied to the preceding, but presents certain differences which appear to necessitate its separation as a distinct species. The single specimen is a fragment consisting of the same segments as *I. bacillus*, save for the fact that the fourth segment of the thorax is incomplete ; unlike the foregoing species, it is a male ; hence the supposed specific difference may be sexual. This species is to be distinguished from *I. bacillus* by the fact that the sixth segment of the thorax as well as the fifth has a pair of lateral spines. In both species the uropoda are simple, each consisting of two joints.

Station 302 ; 1450 fathoms.

## 3. *ISCHNOSOMA SPINOSUM*, n. sp.

This species is more closely allied than either of the foregoing to Sars's two species *Ischnosoma bispinosum* and *Ischnosoma quadrispinosum*, and, like them, comes from the Northern Hemisphere.

The single specimen measures 6 millim. in length. The general shape of the body is similar to *I. quadrispinosum* ; the head is narrower and shorter than the first segment of the thorax ; there is no trace of eyes. The first segment of the thorax is larger than either of the two succeeding, which are subequal ; the fourth segment is much longer and broader anteriorly than posteriorly, where it is closely applied to the fifth segment, which is the longest of all ; the sixth and seventh segments are short. The whole of the dorsal surface of the thorax is roughened and tubercular ; the lateral margins of the first three segments are furnished with two or three longish stout spines, of which one on each side is particularly long ; the dorsal region of these segments is not only tubercular but furnished with a few longish spines ; the fourth segment has no long lateral spines like those of the preceding segment ; the remaining thoracic segments have likewise no lateral spines. Between the thorax and abdominal shield is a single free abdominal segment ; the anterior half of the latter is oval ; there is a deep notch behind this, just in front of the articulation of the uropoda, which are borne upon a short truncated process ; the extremity of the abdominal shield is prolonged for some way behind the uropoda, and terminates abruptly in a straight margin. The abdomen is roughened and tubercular like the rest of the body ; there is a row of short spines on either side of the dorsal median line.

Station 78 ; 1000 fathoms.

## *ASTRURUS*, nov. gen.

This genus comes near to *Pleurogonium*, Sars, but may be distinguished by the spiny body, the long bifid rostrum, and the long epimeral spines, which are themselves covered with shorter spines ;

the thoracic appendages are slender and not greatly elongated; they terminate in a single claw; the first pair are subcheliform. The uropoda are rudimentary, consisting of only a single conical setose joint.

1. *ASTRURUS CRUCICAUDA*, n. sp.

This species is represented by a large number of individuals dredged in shallow water off Kerguelen; the largest individuals only measure 4 or 5 millim. in length.

The body is more or less pear-shaped, the anterior region of the thorax being wider than the posterior. The head is narrower than the succeeding segment of the thorax; it is prolonged anteriorly into two long slightly divergent processes, each of which is as long as the head itself; laterally is a longish process on either side, which terminates in a slightly swollen extremity; these processes resemble the eye-stalks in *Munna*, and they contained some orange-coloured pigment in the interior, but no recognizable trace of lenses; the surface, moreover, is covered with numerous short spines like the rest of the body. The four anterior thoracic segments are of nearly equal length, but they increase in width up to the third; the median region of these segments is convex and densely covered with short spines; the lateral margins are prolonged into long stout spines, which are themselves covered with short spines like the thoracic segments and the rest of the body. The three posterior segments are all much shorter than the fourth segment, and decrease gradually in length; their lateral margins are without the greatly elongated spines of the anterior segments; only on the fifth and sixth segments one of the spines which fringe the body is rather more elongated than the rest. The abdominal shield is oval, tapering posteriorly; it terminates in four somewhat flattened spines arranged in the form of a cross. The *antennules* consist of a two-jointed peduncle and a five- or six-jointed flagellum; the proximal joint of the peduncle is broader and shorter than the succeeding joint. The *antennæ* are not so long as the body but considerably longer than the antennules; the two proximal joints of the peduncle are elongated, the flagellum is shorter than either of these. The *mandibles* have a three-jointed palp. The first pair of thoracic appendages are modified into a prehensile limb; the remaining thoracic appendages are slender and elongated, particularly the three posterior pairs. The *uropoda* are rudimentary as in *Munna*.

Kerguelen, 120 fathoms.

NEASELLUS, F. E. B.

*Neseillus*, F. E. Beddard, Narr. Chall. Exp. vol. i. p. 882. fig. 326.

This new genus is represented by a single species from Kerguelen. It comes near to *Pleurogonium* and *Leptaspidia*, but is distinguished by the great horizontal elongation of the head, which is as wide as the following segment and bears the antennary organs at the

extreme lateral margin; eyes are absent. The thoracic segments are separated by deep incisions; the first segment is much the largest, and is fused mesially with the following segment; the margins of the segments are rounded; and the whole body is fringed with numerous leaf-like flattened spines.

1. NEASELLUS KERGOUELENSIS, F. E. B., *loc. cit.*

The extreme length of the single individual of this species is 2 millim.

The body is extremely flattened and depressed, pear-shaped in general outline, being much broader anteriorly than posteriorly. The head is immensely extended laterally, being as wide as the following segment of the thorax, from which, however, it is separated by deep lateral incisions. The central region is convex; the anterior and lateral margins are fringed with peculiar flattened spines, which also border the body throughout. The two first segments of the thorax are together about equal in length to the head in its middle region; the line of suture separating these two segments is obliterated except laterally; the remaining segments are short and subequal, each is about  $\frac{1}{5}$  of the length of the conjoined anterior segments; the third, fifth, and sixth segments have lateral processes, fringed with the peculiar spines referred to, which are absent from the fourth and seventh segments. The shape of the abdominal shield, which is, as in *Pleurogonium* &c., separated from the last segment of the thorax by a single free abdominal segment, is rhomboidal; it is notched posteriorly and laterally where the uropoda articulate. The *antennules* and *antennæ* arise from the extreme lateral margin of the head; in the *antennules* the basal joint is short and stout, the second rather elongated, the third and fourth narrower and shorter than the second, the flagellum has two joints. The *antennæ* are more than half the length of the body, the peduncle has six joints, the flagellum is a little longer than the distal joint. The *mandibles* are furnished with a palp. The first thoracic appendages are cheliform, the remaining thoracic appendages are not greatly elongate. The *uropoda* are as in *Pleurogonium*.

Kerguelen, Christmas Harbour, 120 fathoms.

Genus PLEUROGONIUM, Sars.

1. PLEUROGONIUM ALBIDUM, n. sp.

This species is represented by a single female example measuring 3 millim.

The general shape of the body is like the other species described by Sars; the epimera of the first four thoracic segments are prolonged into spines, which are of equal size upon all the segments; the three posterior segments of the thorax are separated from each other and from the fourth by deep lateral incisions; their epimera are prolonged into stout spiny processes, which are shorter than in the anterior segments; the dorsal surface of each of these three segments is traversed by a narrow ridge. Between the



seventh thoracic segment and the abdominal shield is a narrow free abdominal segment, which is ridged like the posterior segments of the thorax. The abdominal shield is almost circular in its outline anteriorly; posteriorly it terminates in a triangular-pointed extremity; the posterior region is slightly serrated.

Kerguelen, 120 fathoms.

## 2. *PLEUROGONIUM SERRATUM*, n. sp.

This species, like the last, is represented by a single female example measuring 3 millim. in length.

The head is small and almost enclosed by the following segment of the thorax; the frontal margin is straighter than in the last species, and the articulation of the antennæ is not so near to the posterior boundary of the head; the hinder margin of the semi-circular notch which lodges the antennæ is prolonged outwards into a longish pointed process, which extends laterally nearly as far as the epimeron of the first thoracic segment. The thoracic segments are so like the last species that no special description is needed. The most characteristic and obvious difference between the two species is in the abdominal shield, which has, however, the same general shape in *P. serratum* as in *P. albidum*; in the former species the lateral margin as far back as the articulation of the uropoda is strongly serrated; there is no trace of any such serrations in *P. albidum* except along the posterior extremity of the caudal shield behind the uropoda, in which situation they are absent in *P. serratum*.

Kerguelen, 120 fathoms.

## 3. *PLEUROGONIUM MINUTUM*, n. sp.

The third new species of this genus is represented by a single female example, dredged off Tristan da Cunha. It measures about 1 millim. in length.

The general shape of the body is like that of the other species. The epimera of the thoracic segments are not prolonged into spines as in the last two species, but are rounded in the four most anterior segments and truncated in the posterior thoracic segments. The abdominal shield is oval, tapering posteriorly; anteriorly the margins of the abdominal shield are serrated, but the serrations are not nearly so marked, nor do they extend over so great an area as in *P. serratum*. In the two last species the antennæ are twice the length of the antennules; in the present species they are longer, but only half as long again: in this respect therefore *Pleurogonium minutum* is more typical, that is to say it agrees more closely with the northern forms described by Sars.

Off Tristan da Cunha, 100–150 fathoms.

## ACANTHOMUNNA, nov. gen.

This genus is like *Munna* in outward form, and is furnished with a pair of eyes elevated on stalks as in that genus; the thoracic limbs are entirely like those of *Munna* except that they terminate in a



single elongated claw; the antennule has a four-jointed peduncle and a long multiarticulate flagellum; the uropoda are defective but evidently are of considerable size, judging from the socket of articulation. The whole body is covered with short slender spines of varying size, but nowhere very long.

#### 1. ACANTHOMUNNA PROTEUS, n. sp.

This species, the only one referable to the genus, is represented by two individuals, both males, dredged off New Zealand in 700 and 1000 fathoms respectively. The larger specimen measures 7 millim. in length. The general shape of the body is as in *Munna*, but differs in being covered with innumerable spines, many of which are branched; the spines are nowhere of very great length. The head is furnished with a pair of eyes situated laterally; these are elevated upon short stalks; the abdominal shield is preceded by a short free abdominal segment; it is extremely convex anteriorly, and the point of articulation of the uropoda is upon the dorsal surface, though near to the lateral margin; behind the articulation of their appendages, the abdominal shield is flattened and terminates in a truncated, slightly concave extremity. The *antennules* have a four-jointed peduncle, the third joint being the longest, and a multiarticulate flagellum longer than the peduncle. The *mandibles* have a palp. The first pair of thoracic appendages are shorter than the rest and subcheliform; the remaining thoracic appendages are very long, owing to the elongation of the fourth and fifth joints; they terminate in a single claw; these appendages are covered with slender unbranched spines, which arise from tubercles. The uropoda are defective, but appear to have been larger than those of *Munna*, &c., and possibly more fully developed.

Station 168; 1100 fathoms. Station 169; 700 fathoms.

### Fam. ASELLIDÆ.

#### Genus STENETRIUM, Haswell.

##### 1. STENETRIUM HASWELLI, n. sp.

A single species of this genus, the only known deep-water species, was dredged off the coast of S. America in 600 fathoms. The specimen is a male, and measures 16 millim. in length.

The diameter of the body is everywhere much the same except the head and the terminal region of the abdominal shield. The head is prolonged into a short rostrum; eyes are present of narrow linear shape, and set obliquely. The thoracic segments are subequal in length as well as breadth, and the dorsal surface is quite smooth; the margins of the first thoracic segment are prolonged into a triangular spiny process; in the second segment the margin is furnished with a smaller spine-like process; in the two following segments there is in addition a smaller posterior spine; in the fifth segment the antero-lateral spine is much wider, occupying nearly the whole of the lateral margin; in the two remaining segments, the lateral

region is straight. The epimera are fused with the tergum in the first thoracic segment, elsewhere distinct but small. The abdominal shield is as long as the three last segments of the thorax; it is subquadrangular in outline. The *antennules* have four basal joints and a long flagellum, longer than the peduncle. The *antennæ* are furnished with a rudimentary exopodite. The *mandibles* have a palp. The first pair of thoracic limbs are extremely long and prehensile; the remaining thoracic limbs are slender and short, they terminate in two claws. The *uropoda* are hiramose, the endopodite and exopodite being equal.

Station 320; 600 fathoms.

#### IOLANTHE, nov. gen.

This genus appears to be closely allied to *Acanthoniscus*, Sars, with which it agrees in the absence of eyes and in the presence of long spiny epimera and long dorsal spines, and in the shape of the uropoda. It differs in that the thoracic appendages are biunguiculate and in a number of other points, which may be gathered from the following description of the single species referable to the genus.

##### 1. IOLANTHE ACANTHONOTUS, n. sp.

This species is founded on a single female dredged in deep water in the Antarctic Ocean. It measures 24 millim. in length.

The head is as wide as the succeeding segment of the thorax; its margins are prolonged on either side into two spines, of which the anterior is much the longest; the anterior margin of the head is produced into a long rostral spine, which is curved slightly upwards. There is no trace of eyes. The thoracic segments are subequal in antero-posterior diameter; in the dorsal-median line of all the segments is a stout long vertical spine; the lateral margin of the first segment is furnished with a long spiny process; on each of the three succeeding segments are two such spines, the anterior being the longer; in the remaining segments only the anterior spine is present. These spines are not outgrowths of the epimera, which are small and lie beneath them. The abdominal shield is almost circular in form; on either side are three spines arranged at equal distances, which are much shorter than the lateral spines of the thorax. The *antennules* have a four-jointed peduncle, of which the second joint is the longest. The flagellum consists of 24 joints, and is about as long as the three distal joints of the peduncle. The *antennæ* are half the length of the body; the second joint of the peduncle has a spiny process on the outer side as in *Ianthe*, which corresponds (?) to the exopodite; the flagellum is nearly as long as the peduncle. The *mandibles* have a palp. The thoracic appendages are all similar to each other and terminate in two claws. The *uropoda* have a very long proximal joint; the endopodite is extremely short, though larger than the minute exopodite.

Station 153; 1675 fathoms.

## Genus JANIRA, Leach.

## 1. JANIRA ABYSSICOLA, n. sp.

The present species is represented by a single female example, dredged off Fiji in very deep water.

The head has a rounded anterior margin; the eyes are completely absent. The first three segments of the thorax are of about equal length; the next two segments are much shorter, being about one half the length of the anterior segments; the sixth segment has an antero-posterior diameter about equal to that of either of the anterior segments, while the seventh segment is longer than any. The *antennæ* are longer than the body of the animal; the flagellum is much longer than the peduncle. The *mandibles* have a palp. The thoracic limbs are all similar to one another. The *uropoda* are as long as the abdominal shield; they are biramose; the endopodite is stouter and longer than the exopodite.

Station, 1350 fathoms.

## 2. JANIRA TRISTANI, n. sp.

The head is broader than long, with very large, laterally placed eyes; it is prolonged into a long stout rostrum with a rounded extremity. The first two segments are of about equal length; the three succeeding segments progressively diminish in length; the last two are again somewhat longer. The abdominal shield is sub-pentagonal and terminates in a short blunt process. The *antennules* have a long flagellum; the peduncle is composed of four joints, all of which are short. The *mandible* has a three-jointed palp. The thoracic appendages are all similar to each other.

Off Tristan da Cunha, 100-150 fathoms.

## Genus JÆROPSIS, Köhler.

## 1. JÆROPSIS MARIONIS, n. sp.

The only previously known species of this genus was described by M. Köhler, from the island of Sark; the present species was dredged off Marion Island in 100 fathoms. The single specimen measures 4 millim. in length.

The head is roughly quadrangular in outline; the anterior margin is prolonged between the antennæ into a rostrum, which is deeply notched at the extremity; the eyes are of fair size, and dorsal in position; the lateral margins of the head are serrated. The head is about as long as the first two segments of the thorax taken together; the latter are subequal, the third is slightly shorter, the fourth and fifth subequal and very much shorter again; the last two segments are quite as long as the two first; the segments are separated by deep lateral incisions; the lateral margins of the segments are feebly serrated. The abdominal shield is somewhat triangular in outline, and terminates posteriorly in a three-jointed process; in the two notches separating these processes lie the uropoda; the lateral margins are serrate. The *antennules* are very short; the flagellum

has two joints, the distal one being very minute. The *antennæ* have a five-jointed peduncle and four- or five-jointed flagellum; the third joint of the peduncle is longer than the two basal joints, the fourth joint is shorter than the third, the fifth longer. The thoracic appendages are all similar and biunguiculate.

Off Marion Island, 100 fathoms.

Genus TRICHOPLEON, nov. gen.

A single specimen of a deep-sea Isopod dredged at Station 215 does not fall very conveniently within any known genus of the *Asellidæ*.

The general shape of the body is like that of *Asellus*, with which it also agrees in the uniunguiculate thoracic appendages; eyes are completely absent; the first four thoracic segments are furnished on either side with a forwardly-directed lateral spine. The *antennæ* have a movable scale attached to the second joint, as in *Janira* and *Stenetrium*. The surface of the body is quite smooth.

1. TRICHOPLEON RAMOSUM, n. sp.

The specimen is an immature female, measuring 5 millim. in length.

The head is narrower, but longer than the succeeding segment of the thorax; it is prolonged into a short wide process anteriorly. There is no trace of eyes. The three first segments of the thorax are subequal in length; the fourth segment is shorter; the three posterior segments gradually increase in length but diminish in breadth; the antero-lateral margin of the first four segments is furnished with a short, acute, forwardly-directed spine. The abdominal shield is oval, but wider anteriorly than posteriorly; it terminates behind in the middle line in a short spiny process. The *antennules* are about as long as the head and first two segments of the thorax together; the peduncle has four joints, of which the second joint is the longest; the flagellum consists of about fifteen joints. The *antennæ* are about equal in length to the body; the flagellum is longer than the peduncle; the two basal joints of the peduncle are very short, the third a trifle longer, with an articulated scale on the outer side; the two distal joints are long and subequal. The *mandibles* have a palp. The thoracic appendages are similar to each other, terminating in a single claw. Uropoda moderately long, biramose, each ramus one-jointed.

Station 214; 500 fathoms.

Fam. ARCTURIDÆ.

Genus ARCTURUS, Latreille.

1. ARCTURUS MYOPS, n. sp.

The present species differs from any other *Arcturus* at present known by the fact that the eyes are entirely or almost entirely aborted. The only trace of eyes left are a pair of rounded tubercles, which appear to contain no pigment and are not faceted. The largest

individual measures about 9 millim. The first four thoracic segments are subequal in length; each is ridged posteriorly, the ridge widening out laterally to occupy the whole of the segment, it is covered with fine granulations; in the fourth segment the ridge is higher than in the preceding segments; anteriorly between the ridge and the anterior margin of the segment is a shorter ridge, likewise covered with numerous minute tubercles; on the first thoracic segment is a third ridge; of the three posterior segments the first is the longest; on each is a posterior ridge-like elevation beset with numerous tubercles. The abdominal shield is oval, tapering towards its extremity, which is slightly upturned; like the thorax, it is tuberculate. The proximal joints of the antennæ and of all the thoracic limbs are beset with tubercles.

Station 169; 700 fathoms.

## 2. *ARCTURUS ANNA*, n. sp.

This single specimen of this large species measures 37 millim.; the antennæ are nearly twice the length of the body. The head is excavated in front; the antero-lateral margin of the head is notched ventrally. The first four segments of the thorax are subequal; each is traversed by a ridge, which dorsally is narrow and only occupies the posterior portion of the segment, laterally it is widened out and occupies the whole of the segment; in front is another shorter ridge, which does not reach the lateral region of the segment; at the extreme lateral margin is a stout spine, inclined nearly at right angles to the longitudinal axis, which overlies the epimeron; behind are one or two shorter spines along the postero-lateral border of the tergum. The epimera, which are short, are likewise furnished with one or two short spines; these are only conspicuously developed upon the last two of the segments, especially upon the last, where one of the spines equals in length the tergal spine which it directly underlies. Of the three posterior segments the first is decidedly the largest; they are ridged like the anterior segments, the ridge widening out laterally; each segment has a short lateral spine corresponding to those on the anterior segments; the epimera are also furnished with a stout spine, that of the fifth segment with an additional spine directed forwards. There are two completely free abdominal segments, the third being to a large extent fused with the abdominal shield; on the ventral side of the first abdominal segment is a short spine on either side anteriorly and another pair of longer spines posteriorly; this segment as well as the next has a short lateral spine; the third abdominal segment has on either side a long curved spine at the postero-lateral margin. The abdominal shield has a central convexity occupying nearly the whole of its extent and bordered by a flattened rim, which is serrated, and terminates posteriorly in a pair of pointed processes projecting behind the central area, which terminates posteriorly in a short pointed spine. The thoracic limbs of the second, third, and fourth pairs have one or two longish spines on the three proximal joints.

Station 320; 600 fathoms.

3. *ARCTURUS CORNUTUS*, n. sp.

This species, like the last, is represented by a single female example, measuring 36 millim. ; the length of the antennæ is 64 millim.

The margin of the head is excavated dorsally and anteriorly ; the antero-lateral margin of the head below and in front of the eyes is notched ; between the eyes are a pair of long, forwardly-directed spines, and behind the eyes a pair of blunt tubercles. The first three thoracic segments are subequal, and each is a little longer than the fourth. Each of the segments is ridged as in the last species ; the lateral margin of the tergum has a long spine in each of their segments, and there is another spine of equal length placed halfway between the dorsal median line and the lateral margin of the segment ; on the fourth segment there is an additional lateral spine placed behind the principal spine ; there are indications of a corresponding spine in the anterior segments. The epimera of segments 2-4 have a single spine near to their posterior margin, the lengths of which increase progressively from before backwards ; in front of the posterior tergal ridge are a pair of blunt tubercles united by a slight elevation ; the first segment has also a single tubercle placed in front of this. Each of the three posterior segments is ridged as in *A. anna* ; laterally is a long spine which overlies a similar spine upon the epimeron ; the first of these segments has also a somewhat longer epimeral spine directed forwards. Each of the three free abdominal segments has a long lateral spine ; the first segment has ventral spines as in the last species. The abdominal shield has the same shape as in *A. anna*, but there is a distinct longitudinal keel terminating in a sharp upturned point ; on either side is a single row of curved hook-like spines. The 2nd, 3rd, and 4th pairs of thoracic limbs have spines similar to those of the last species.

Station 214 ; 500 fathoms.

4. *ARCTURUS BRUNNEUS*, n. sp.

This species measures 19 millim. in length, the antennæ being of about the same length. The head is furnished with a pair of long spines between the eyes, and a pair of shorter spines behind these, which are, however, longer in the female. The first four thoracic segments are subequal, ridged as in the last two species ; on this ridge are implanted a number of long, straight, slender spines. In the male the first segment has four equidistant spines and a minute epimeral spine at the extreme lateral margin ; on the second segment the epimeral spine is longer, and there is a minute tubercle between it and the lateral tergal spine ; in the third and fourth segments the lateral tubercle is developed into a spine, and there is also a short median dorsal spine ; on the second, third, and fourth segments there is a transverse row of longish spines near to the anterior margin of the segment in both sexes ; in the female the spines are longer. Each of the three posterior thoracic segments bears a ridge, with a single row of long spines arranged at equidistant intervals ; there are three pairs of these spines, one pair epimeral ; in the



female there are several shorter ones in addition. The first abdominal segment has a single row of comparatively short backwardly-directed spines; on the second and third segments these spines get to be considerably longer, especially the lateral spine on either side, which marks the commencement of the abdominal shield. The abdominal shield in both sexes is covered with longish curved spines; just above and near to the termination of its lateral margins are an extremely long pair of spines directed outwards and slightly upwards. The proximal joints of the antennæ and of the thoracic appendages are furnished with spines. The uropoda are tuberculate in the male and spiny in the female.

Station 147; 1600 fathoms.

##### 5. *ARCTURUS PURPUREUS*, n. sp.

This species is represented by a single female, which is of a purplish colour. It measures 18 millim., the length of the antennæ is 31 millim.

On the head between the eyes are a pair of long forwardly curved spines; the hinder portion of the head is occupied by a rounded median convexity; on the antero-lateral margin is a very short forwardly directed spine, beneath which the margin is excavated by a semicircular notch. Of the first four thoracic segments, the fourth is rather the shortest; each of the segments bears an outwardly directed spine on each side of the body, corresponding in position to those upon the head; close to the lateral margin of each segment and projecting over the epimeron is another long spine; the first segment differs from the succeeding in having no free epimera, and the lateral margin has two spines instead of one, of which the anterior is the longer; the fourth segment has also a second spine at its postero-lateral margin. Of the three posterior thoracic segments the first is the largest; the epimera of all have a long outwardly directed spine; the first of these segments has in addition a tergal spine on either side exactly overlying the epimeral spine. The first abdominal segment has a pair of long lateral spines and a pair of short ventral spines; the third segment has a pair of lateral spines. The abdominal shield is oval, with a faintly marked central keel, terminating posteriorly in a long spine; its lateral margins are flattened and unite posteriorly; on either side are two flattened spines situated at equidistant intervals. The antennæ and anterior thoracic limbs have a few spines upon the proximal joints; the uropoda are granulated, but bear no spines.

Station 23; 450 fathoms.

##### 6. *ARCTURUS SPINIFRONS*, n. sp.

This species reaches to a length of 13 millim., the antennæ measuring 20 millim. The body is extremely tuberculate, but there are no spines except a single pair upon the head; the lateral margin of the head, as in *A. anna*, is notched ventrally. The four anterior thoracic segments are subequal, each has a posterior ridge which



widens out laterally; the ridge is concave forwards, dorsally, and closely embraces a median oval convexity which lies in front of it; the fourth thoracic segment has a row of short tubercles, arranged in a semicircle with the concavity directed forward, on the ventral surface. Of the three posterior thoracic segments the first is the largest, the second and third being smaller and subequal; each of the segments is traversed dorsally by a strong ridge, which is tuberculate; the first of these segments has a number of short tubercles scattered over the ventral surface, and the two succeeding segments are ridged in the same region. The segments of the abdomen are comparatively smooth, being only slightly roughened laterally. The abdominal shield is smooth with the exception of the lateral margins, which are serrate; it terminates in a short median spine. The thoracic appendages are tuberculate on the proximal joints; the uropoda bear a single median longitudinal row of tubercles.

Station 174; 600 fathoms.

#### 7. *ARCTURUS SPINOSUS*, n. sp.

This is the largest of the deep-sea species, measuring up to 48 millim., the antennæ measure 60 millim. The males differ slightly from the females, the latter being wider in the thoracic region and more spiny. The anterior margin of the head is excavated; between and a little in front of the eyes are a pair of long spines, behind these are a pair of shorter spines; in the female there is an additional pair of spines situated outside these latter. Of the first four thoracic segments, the fourth is slightly the longest in the male; in the female all four are subequal. On the first three thoracic segments, the posterior ridge bears three pairs of long spines situated at equidistant intervals; the fourth thoracic segment has only two pairs, but the epimera have each a long spine, wanting in the anterior segments. In the female the first thoracic segment has four pairs of spines, the other segments being as in the male; between these principal spines there are, however (in the female), numerous smaller spines, and the margins of the epimera are furnished with short spines; each of these segments has in both sexes an anterior ridge covered in the male with blunt tubercles, in the female these tubercles are pointed. Of the three posterior thoracic segments the first is the longest; the posterior ridge is tuberculate, the tubercles being more strongly marked in the female; the epimera of these segments have a large lateral spine. The three first abdominal segments are distinct; the last free segment has a long lateral spine on either side in the female. The abdominal shield terminates in a single median spine, and in two longer upwardly curved lateral spines. The surface of the abdominal shield is tuberculate in the male and covered with short spines in the female; in this sex there are in addition a pair of moderately long lateral spines, situated just in front of the posterior lateral spine. The thoracic appendages in the female have a few short spines; in the male only the three last pairs are thus provided; the uropoda are tuberculate.

Station 146; 1375 fathoms.

8. *ARCTURUS GLACIALIS*, n. sp.

This new species comes near to the last, but may readily be distinguished by the fact that the spines are more numerous, shorter, and more slender. The single example, a female, measures 32 millim. The dorsal surface is densely covered with short slender spines, which extend on to the thoracic appendages and uropoda; the spines are of uniform length. The anterior margin of the head is excavated by a shallow semicircular notch; between and in front of the eyes are a pair of long spines, inclined somewhat away from each other; the spines on the thoracic segments are disposed in the following way:—each of the first four segments has a posterior and anterior ridge as in other species; both these are covered with spines, as are also the epimera; between the two ridges in all but the first segment are a pair of short spines; each of the three posterior thoracic segments is ridged, the ridge being beset with spines except in the median dorsal line. The abdominal shield is beset with spines, except in the dorsal median line, where it is grooved longitudinally.

Station 153; 1675 fathoms.

9. *ARCTURUS ABYSSICOLA*, n. sp.

This species was obtained from two stations in the Pacific Ocean, but near to each other.

The length is about 20 millim., the length of the antennæ 42 millim. Of the first four thoracic segments the second and third are equal in size and rather longer than the first and fourth; each of these segments is ridged posteriorly as in other species; laterally the tergum is produced into a short tubercle and there is a similar tubercle upon the epimera; on the first segment this tubercle is prolonged into a spine; on the inferior surface of the fifth segment is a short median transverse ridge; the first abdominal segment has a pair of ventral tubercles; the abdominal shield is keeled and terminates in a blunt spine, it is covered with a few low scattered tubercles. The anterior thoracic appendages are furnished with one or two spines upon the proximal joints; as in *A. anna* the posterior thoracic appendages have not these spines.

Station 184; 1400 fathoms. Station 281; 2385 fathoms.

10. *ARCTURUS STUDERI*, n. sp.

The extreme length of this species is 28 millim., length of antennæ 30 millim. The head has two pairs of long spines situated one behind the other, behind these again is a ridge bearing a few short spines; the antero-lateral region of the head is notched ventrally as in *A. purpureus*, &c. The four anterior thoracic segments are subequal; on the posterior ridge of the first segment are a pair of minute tubercles on either side of the median dorsal line; laterally are two long spines equidistant from each other and the dorsal tubercles; the lateral margin of the tergum is prolonged into two outwardly directed spinous processes; in front of the posterior ridge are four minute tubercles arranged transversely; the second segment

is similar; the third and fourth segments have in addition another spine upon each side, placed between and behind the two lateral spines; the margins of the epimera are prolonged into three short spines. Each of the three posterior thoracic segments has two or three long spines on either side; the epimera are large and terminate in two stout spines. The two anterior abdominal segments each consist of two portions—a narrower anterior and a smaller posterior portion; the former is smooth, the latter beset with spines and tubercles; on the first segment are two particularly long spines, one situated close to the ventral margin of the tergum, exactly above this is the other, which is of equal length; on the second segment is a lateral spine of great length, but situated more dorsally; the third segment has also a pair of lateral spines. The abdominal shield has a dorsal keel which is prolonged posteriorly into a curved spine. The whole of the dorsal surface is covered with minute pointed tubercles; the lateral region of the abdominal shield is flattened as in *A. anna*, &c., and terminates posteriorly on either side in a flattened triangular spine.

Kerguelen, Royal Sound; 28 fathoms.

#### 11. ARCTURUS OCULATUS, n. sp.

Five specimens of this small species were dredged in shallow water off Melbourne, South Australia. The largest measures no more than 7 millim. The most remarkable point about this species, and one which serves at a glance to distinguish it from any other recorded species of the genus, is the elevation of the eyes on to stalks as in the genus *Munna*. The frontal margin of the head is broad and truncated; it is not excavated as in so many other species. The first four thoracic segments are subequal in length, they are convex posteriorly and flatter anteriorly; the surface of these segments is quite smooth and free from tubercles or spines; in the last three of these segments the epimera are furnished with a long spine. The posterior thoracic segments, like the anterior, possess an epimeral spine; each of these segments has also a lateral tergal spine. Of the three free abdominal segments the first and third are furnished with a lateral spine on either side, which is absent from the middle segment. The abdominal shield is very convex, and terminates in a median dorsal spine as in so many other species; the lateral margin of the caudal shield is beset with a series of somewhat curved spines situated at equidistant intervals, the lateral margin terminates in a longish flattened spine as in *A. anna*. On either side of the dorsal median line is another row of spines, which run from end to end of the caudal shield.

Station 161; 38 fathoms.

#### Family CYNOTHOIDÆ.

##### ANUROPUS, nov. gen.

Among the Isopoda dredged during the cruise of the 'Challenger,' there are not many deep-sea species which present any striking differences from the Isopoda of shallow water. One of these species

is represented by a single specimen, which was dredged in the Pacific Ocean at Station 218, in 1070 fathoms of water. It is a large Isopod, measuring upwards of two inches in length, and agrees in most particulars with such genera of the Cymothoidæ as *Æga*; but at the same time it presents certain remarkable peculiarities analogous to those exhibited by the aberrant genus *Bathynomus* lately described by Prof. A. Milne-Edwards from deep water in the North Atlantic. M. Milne-Edwards's preliminary account of *Bathynomus* was communicated to the French Academy<sup>1</sup>, and a translation of his note has appeared in the *Ann. & Mag. of Nat. Hist.*<sup>2</sup> Apart from its huge size, the most remarkable feature in the organization of *Bathynomus* is the great development of branchial organs: "it appears," says M. Milne-Edwards, "that the respiratory apparatus of an ordinary Isopod is insufficient to supply the physiological needs of *Bathynomus*, and that the development of special organs of a greater functional power has been rendered necessary. The abdominal limbs, which usually in this group constitute the sole branchial apparatus, in *Bathynomus* only serve the function of a covering to the gills which lie beneath them." The gills of this Crustacean are in fact represented by a series of complicated branched outgrowths of the body-wall in the ventral region of the abdomen. The same end is attained by the Crustacean, which forms the subject of the present remarks, in a different manner. Instead of a development of accessory respiratory organs, *Anuropus* (as I may term the genus from its chief structural peculiarity) exemplifies one extreme of the Isopodan type, in that *all the abdominal appendages are converted into respiratory organs*; the increase of respiratory surface is thus attained by an exaggeration of a structural character, which is common to all the members of the family, and which indeed is an important basis of distinction from other families of Crustacea. In all the members of this group more or fewer of the abdominal limbs are soft foliaceous appendages, which permit of an easy exchange of gases between the contained blood and the sea-water. There is no instance, however, among the Isopoda in which all the abdominal appendages are similar, functioning as respiratory organs, except in this deep-sea genus *Anuropus*. *Bathynomus*, as regards the uropoda, is quite a typical Isopod; these appendages form a pair of swimming-feet as they do in the other Cymothoidæ<sup>3</sup>.

The modifications of the terminal pair of abdominal appendages or uropoda serve to divide the Isopoda into natural families, which prove to be allied in other particulars; and some stress, therefore, from a classificatory point of view, should perhaps be laid upon the fact of their modification in *Anuropus*, though it is always open to question how far a purely adaptive character is of value. Since the present genus agrees with the Cymothoidæ in the general form of the body, in the number of free abdominal segments, and in fact in all essentials, it would perhaps be hardly permissible to remove it

<sup>1</sup> 'Comptes Rendus,' Jan. 1879.

<sup>2</sup> *Ann. & Mag. Nat. Hist.* 1879 (vol. iii.), p. 241..

<sup>3</sup> There is a figure of *Bathynomus* in an interesting work recently published by M. Filhol and entitled 'La vie au fond des mers,' Paris, 1885.

from that family on account of the branchiate uropoda; but *Anuropus* should at least be regarded as the type of a special subfamily equivalent to any of the other four, viz. *Cymothoadiens errants*, *C. raviseurs*, *C. branchifères*, and *C. parasites*, into which MM. H. and A. Milne-Edwards have divided the family. *Anuropus* has a further "abyssal character" in the absence of eyes, and it is also remarkable for the abortive antennules, which are only represented by two joints—a stout basal joint, and a longer stout curved distal joint, which is possibly the equivalent of a metamorphosed flagellum. The single species I may term

1. *ANUROPUS BRANCHIATUS*, n. sp.

The extreme length of the specimen, which is a female, is 70 millim. The head is small, and entirely without eyes; the body is extremely convex; the thoracic segments are subequal, the six posterior are furnished with distinct epimera; the abdominal segments are all smaller than the thoracic segments and subequal; the fifth segment is fused with the telson and forms a caudal shield, which is rounded and flattened in shape. There is no trace of eyes; the *antennules* are short and thick, consisting of a thick basal joint and a longer, somewhat curved distal joint. The *antennæ* are longer and more slender, and quite normal in structure; the *mandibles* have a three-jointed palp. The abdominal appendages are all similar to each other, consisting of a short, stout, basal joint, and two equal rami flattened and rounded in form.

Station 218; 1070 fathoms.

Fam. SPHEROMIDÆ.

Genus CYMODOCEA, Leach.

1. *CYMODOCEA ABYSSORUM*, n. sp.

This species is the only representative of the family at present known from deep water; it is represented by two individuals, one a male, the other a female. The body in both is flattened, and is evidently incapable of being rolled into a ball. The eyes are small and whitish from the absence of pigment; the first thoracic segment is broader than the head, the following segments are subequal, and with well-developed sickle-shaped epimera, absent in the last of the segments. Abdominal shield with two blunt conical spines on the dorsal surface, one behind the other; posterior extremity obtuse and rounded. *Uropoda* with the rami subequal in the female, the outer being slightly the longer; in the male the outer ramus is very much longer than the inner and curved inwards.

Station 218; 1070 fathoms.

Fam. APSEUDIDÆ.

Genus APSEUDES, Leach.

1. *APSEUDES ANTARCTICA*, n. sp.

The largest specimen of this small species measures 4 millim. in length. The cephalothorax is nearly as long as the first four segments

of the thorax ; it terminates in the middle line anteriorly in a sharp rostral prolongation. The free thoracic segments increase in length, but decrease in width up to the fourth, but there is less difference between the first three than between the third and fourth ; the fourth and fifth segments are subequal ; the sixth is shorter, but not perceptibly narrower than the fifth ; in the first segment the epimera are prolonged into a spine ; on the fourth and fifth segments are two knob-like projections on either side, equidistant from each other, and from the epimeron ; on the terminal segment there is a single process ; the five anterior abdominal segments are subequal, and furnished laterally with sharp spiny epimera. The caudal shield is hourglass-shaped, being constricted in the middle, it narrows rapidly to the obtusely pointed extremity. The outer flagellum of the *antennules* has eight joints, the inner only three. The *uropoda* are extremely elongated ; the endopodite has two joints, the exopodite six.

Kerguelen ; 120 fathoms.

#### TYPHLOPSEUDES, nov. gen.

This genus is distinguished from *Apseudes* by the almost complete disappearance of the ocular lobes, which are represented by a small triangular process without any trace of ocular structures ; by the absence of an exopodite to the chelipeds and fossorial limbs ; and by the fact that the exopodite of the abdominal appendage is distinctly bi-articulate. In the last character this genus agrees with *Sphyrapus*.

##### 1. TYPHLOPSEUDES NEREUS, n. sp.

This species attains to a length of about 10 millim. The body is somewhat flattened and depressed, very much wider anteriorly than posteriorly ; the cephalothorax terminates in front in a sharp rostrum ; to the outside of the antennules is the triangular pointed ocular lobe, which contains no optic structures ; some way below this is a pointed lateral process. The free thoracic segments diminish in breadth, but increase in length up to the fifth ; the sixth is narrower but shorter than the fifth ; the epimera of the first thoracic segment project as a spiny process ; the lateral margins of all but the first two segments are furnished with a short spine placed halfway between the epimera and the anterior margin of the segment ; on the ventral median line of the thoracic segments is a spiny process ; similar minute spines exist upon the abdominal segments. The abdominal segments with the exception of the last are furnished with small pointed epimera ; the last segment is as long as four of the anterior segments, it terminates in a straight truncated extremity, in the middle of which is a short knob-like process. The *antennæ* have a rudimentary exopodite. The *chelipeds* and *fossorial limbs* are normal in structure, but possess no exopodite. The *uropoda* are extremely long, as in *Apseudes*.

Station 23 ; 450 fathoms.



## LEIOPUS, nov. gen.

This genus is closely allied to the last, but differs in that the chelipeds and fossorial limbs have an exopodite. The chelipeds are extremely slender and delicate in their structure, and this, together with the characters of the abdominal appendages, serves to distinguish the genus from *Apseudes*.

## 1. LEIOPUS LEPTODACTYLUS, n. sp.

This species attains to a length of 13 millim.

The cephalothorax is prolonged in front into a long rostrum; the ocular lobes are large and pointed anteriorly; there is no trace of any optic structures; behind the ocular lobes are two long spiny processes, one on either side. The first free segment of the thorax is as wide as the cephalothorax; the following segments decrease in width, the first suddenly, the rest more gradually; the length of these segments increases up to the fourth; the fifth is of equal length with the fourth, the sixth rather shorter; the first segment has well-developed spiny epimera; the last three segments of the thorax have also short spines upon the epimera, which are wanting in the intermediate segments; upon all the free thoracic segments, with the exception of the first, are a pair of long lateral spines like those of *Typhlapseudes*, but longer. On the ventral surface of both the thoracic and abdominal segments, with the exception of the last, is a median spine. The abdomen is much as in the last-described species. The outer flagellum of the *antennules* has twenty-seven joints, the inner only six. The *antennæ* have a rudimentary exopodite. The *chelipeds* are very slender and delicate. The *uropoda* are as in *Apseudes*.

Station 78; 1000 fathoms.

## Fam. TANAIIDÆ.

Genus TANAIS, Audouin & Milne-Edwards.

## 1. TANAIS HIRSUTUS, n. sp.

The extreme length of this species is 9 millim.

The body is elongated, the anterior region is wider than that which follows; the last thoracic segment and the first three abdominal segments are again wider, after which the body narrows towards the termination. The cephalothorax has a short obtuse rostrum; the two first segments of the thorax are short and subequal, the third segment is narrower but longer; the two following segments increase progressively in length, the first is about twice the length of the preceding segment; the last thoracic segment is wider than the preceding, but shorter. The first three segments of the abdomen are wider as well as longer than the following; the terminal segment ends in a blunt, rounded extremity. The *antennules* have a three-jointed peduncle and a two- or three-jointed palp; the extremities of the joints of the peduncle are surrounded by a circle of fine delicate plumose hairs of great length. The *antennæ* are similarly beset



with fine hairs. The *uropoda* are uniramous and consist of twelve joints.

Off Prince Edward's Island ; 50-150 fathoms.

Genus *TYPHLOTANAIS*, G. O. Sars.

1. *TYPHLOTANAIS KERGUELENENSIS*, n. sp.

The individuals of this species measure up to 3 millim. in length. The cephalothorax is short and wide ; it is prolonged between the antennæ into a short pointed triangular process ; eyes completely aborted. The first segment of the thorax is shorter than the rest which are subequal, diminishing slightly towards the posterior extremity of the body ; the first segment has a compressed forwardly-directed spine arising from the median ventral surface ; there is a trace of a similar process on the second segment. The first pair of thoracic appendages arise close to the anterior border of their segment, the second pair further back, the third pair from about the middle of the segment ; the three posterior pairs of thoracic appendages arise close to the posterior boundary of their segments. The *antennules* are about as long as the cephalothorax. The *chelipeds* are rather slender. The *uropoda* are biramous, the outer ramus one-jointed, the inner two-jointed.

Kerguelen, Christmas Harbour ; 120 fathoms.

2. *TYPHLOTANAIS BRACHYURUS*, n. sp.

The length of this species is 8 millim. The cephalothorax is hardly longer than the first free thoracic segment ; the first thoracic segment is one third less than either of the two following, which are subequal ; the fourth segment is hardly shorter than the third, the fifth and sixth decrease progressively. The first pair of appendages is attached close to the anterior border of the segment ; the two following pairs are moved a little way back, but are still quite close to the anterior extremity of their segments ; the three posterior pairs are attached close to the posterior border of their segments. There is no ventral spine on the first free segment. The abdomen is short, and not so long as the last two segments of the thorax. The *antennules* are rather shorter than the cephalothorax. The *chelipeds* are short and stout. As in the last species, the three following pairs of appendages are more slender than the three posterior pairs. The *uropoda* are as in the last species.

Station 246 ; 2050 fathoms.

*NEOTANAIS*, nov. gen.

This genus comes nearest to *Heterotanaïs*, but differs in the great length of the endopodite of the uropoda, and in the fact that the chelæ are fully developed and of the normal structure in the male ; a well-marked character of this genus is the specialization of the thoracic appendages into an anterior and posterior series ; in the first three pairs the distal joint of the limb is a single, somewhat curved

claw ; in the posterior appendages this terminal joint is furnished at its distal extremity with a circle of slender spines and a long, mesial, slender hair.

1. *NEOTANAIS AMERICANUS*, n. sp.

The species is represented by two specimens, both males, measuring about 7 millim. The body is elongated and everywhere of approximately the same diameter. The cephalothorax has a convex anterior margin ; on either side of the antennules are the minute, but separate, ocular lobes, which, however, show no traces of ocular structures. The thoracic segments increase in length up to the fourth, after which they diminish. The five anterior abdominal segments are subequal, the terminal segment is of course longer, it terminates in a minute, median, triangular process. The *antennules* consist of a three-jointed peduncle, and a four-jointed flagellum, the joints of which are very minute. In the *antennæ* the peduncle is five-jointed, and the flagellum consists of four joints. The *chelipeds* are short and stout. There is no difference in size between any of the succeeding thoracic appendages, only the difference in the terminal joint referred to above. All the abdominal appendages are present ; the *uropoda* consist of a very stout basal joint, with which are articulated the long eight-jointed endopodite and the small two-jointed exopodite.

Station 45 ; 1250 fathoms. Station 323 ; 1900 fathoms.

Genus *LEPTOGNATHIA*, G. O. Sars.

1. *LEPTOGNATHIA AUSTRALIS*, n. sp.

A single female example of this species was dredged in shallow water at Kerguelen, it measures 4 millim. The body is extremely narrow and elongated. The cephalothorax is longer than the first segment of the thorax, but not so long as the first two segments ; the eyes are completely absent ; the first segment of the thorax is shorter than any of the three following, which are subequal, and each about half as long again as the first segment ; the fifth segment is shorter than the fourth, but a trifle longer than the first ; the last segment of the thorax equals the first in length ; the first pair of thoracic appendages are articulated close to the anterior margin of their segment ; the second, third, and fourth pairs at about the middle of their respective segments ; the last two pairs are articulated a very little nearer to the posterior margin. The abdomen is altogether as long as the last two segments of the thorax and one half of the fourth. The *antennules* are not so long as the cephalothorax, they are four-jointed. The *chelipeds* are stout and robust, all the joints are smooth, the distal joints are not serrated as in *L. longiremis*, the three anterior pairs of thoracic appendages are more slender than the posterior pairs. The rami of the *uropoda* are both biarticulate, but the endopodite is much longer and stouter than the exopodite.

Kerguelen, Christmas Harbour, 120 fathoms.